Water quality of tributaries in the Chulitna River drainage of the Lake Clark National Park and Preserve and adjacent watersheds

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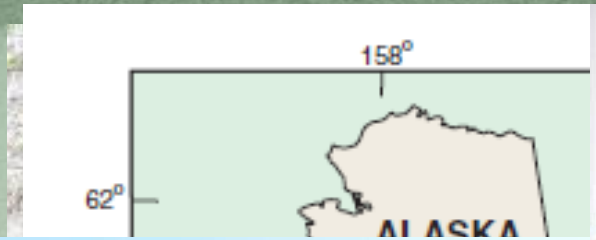
Southwest Alaska Park Symposium

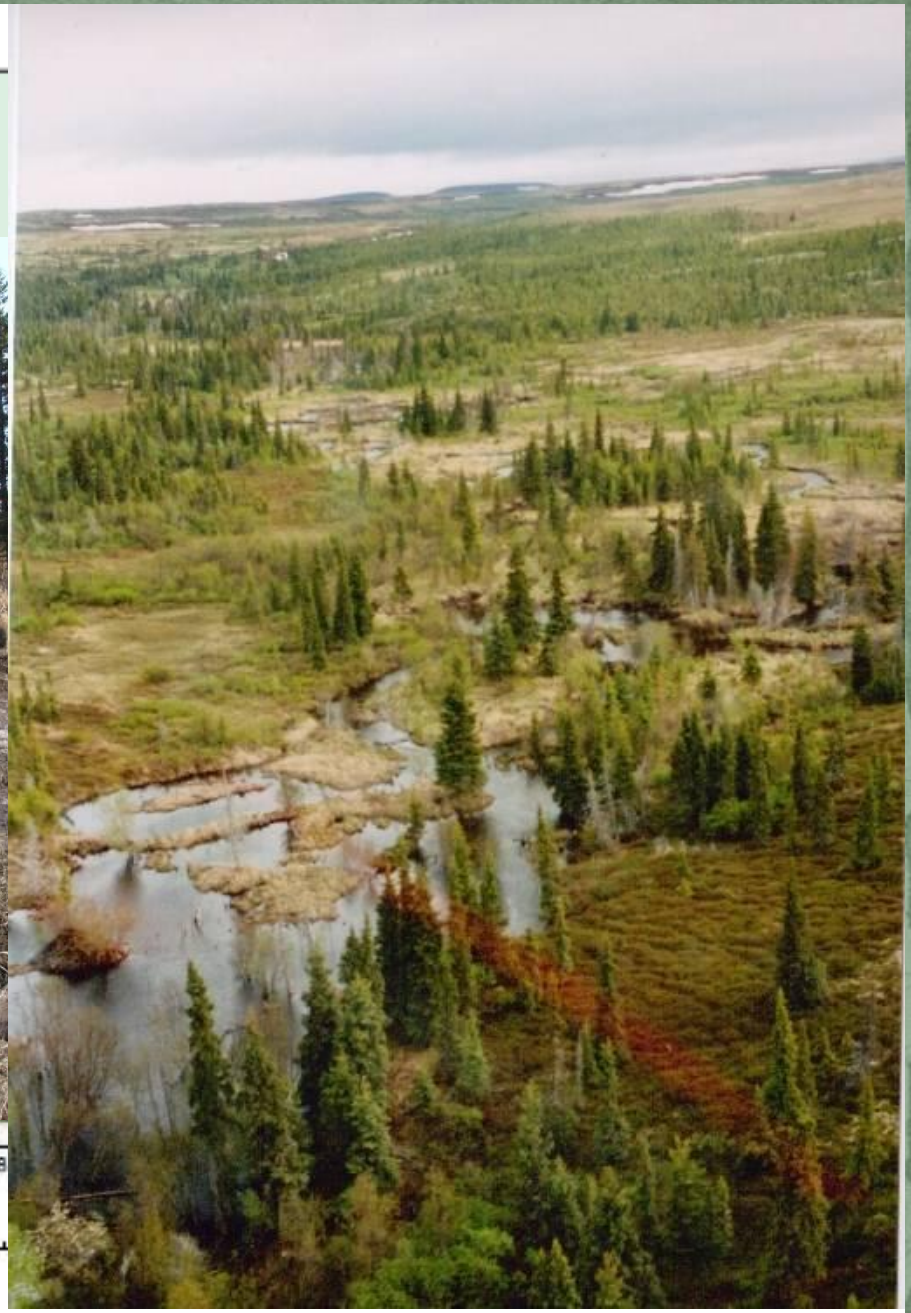
Anchorage, AK

November 3, 2011

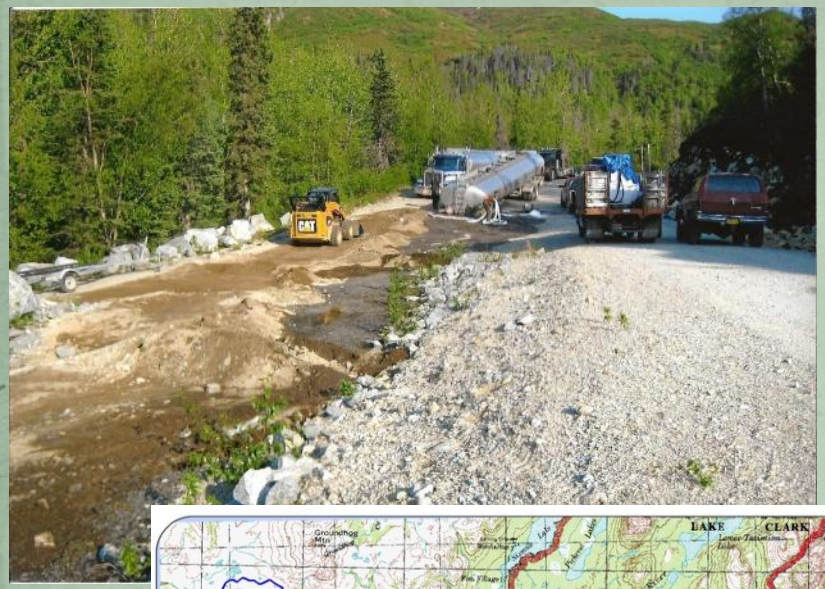
Where

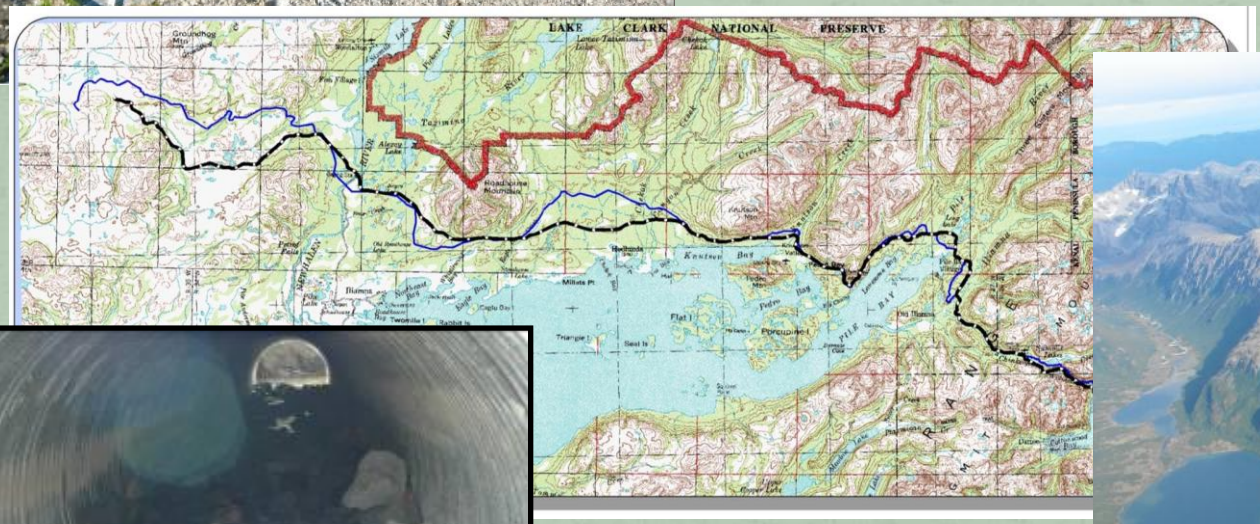

158°
62°
ALASKA

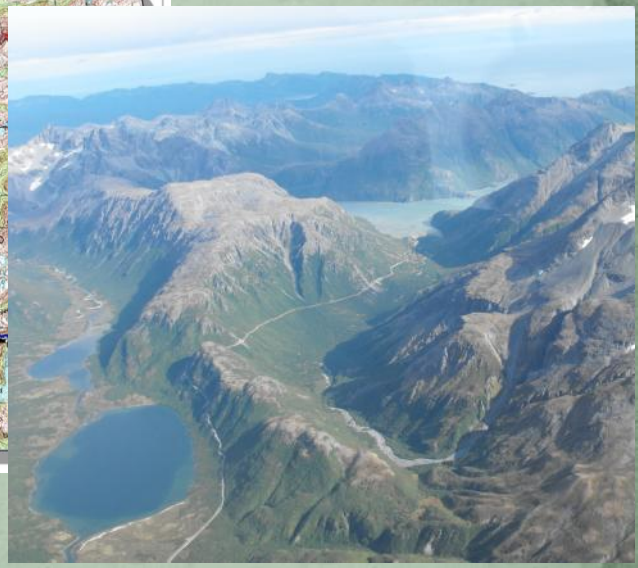

155.50000° W
155.41667° W
155.33333° W
155.25000° W
155.16667° W
NATIONAL GEOGRAPHIC



Risks





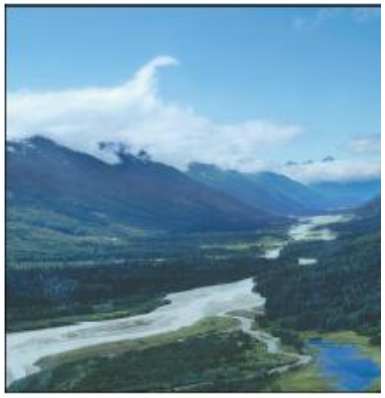


Baseline Data Available

USGS
science for a changing world

Water Quality of the Tlikakila River and Five Major Tributaries to Lake Clark, Lake Clark National Park and Preserve, Alaska, 1999-2001

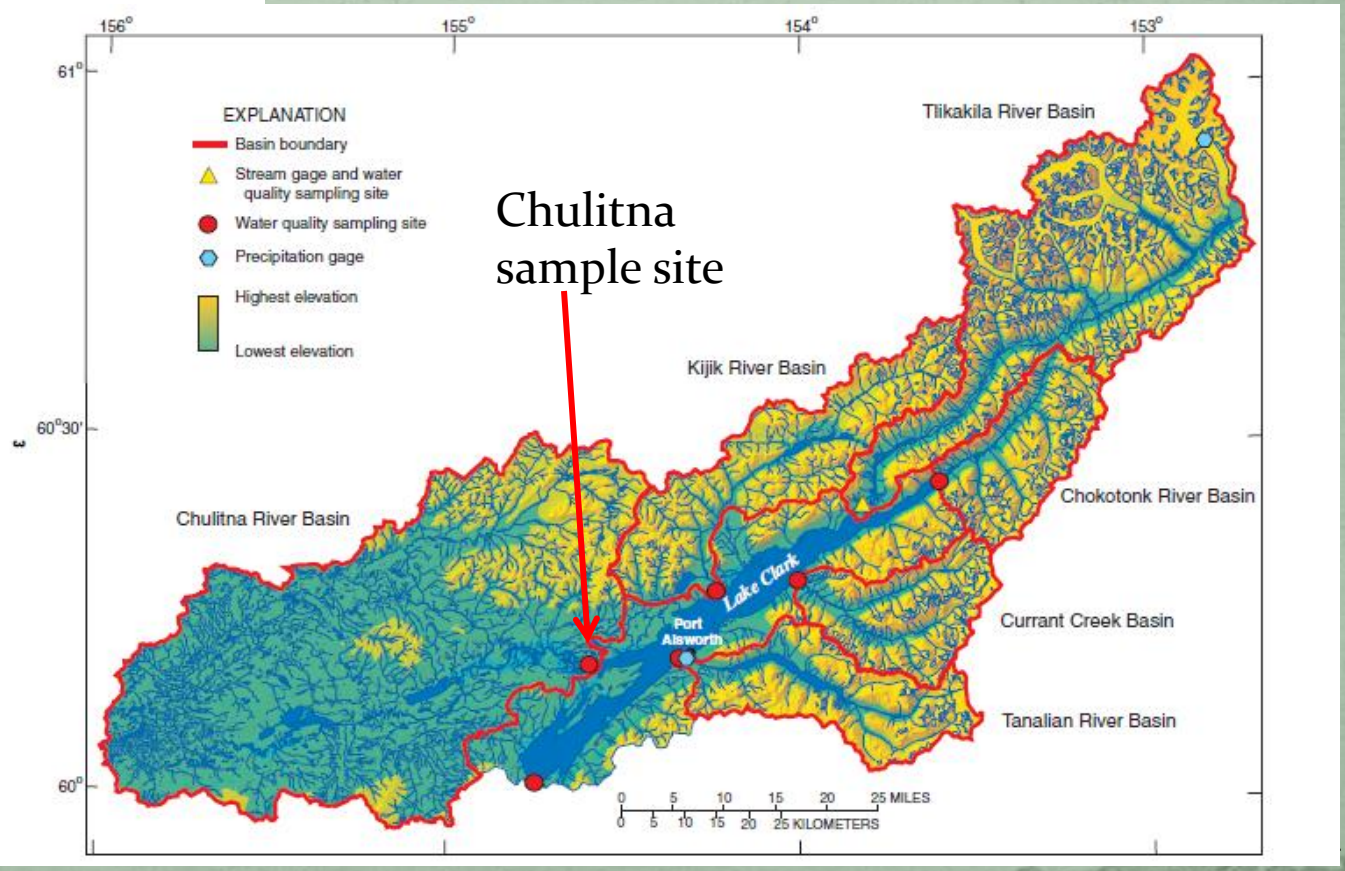
Water-Resources Investigations Report 02–4127



Prepared in cooperation with the NATIONAL PARK SERVICE

U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

- Sediment load, discharge
- Temperature, conductivity, pH, alkalinity, dO



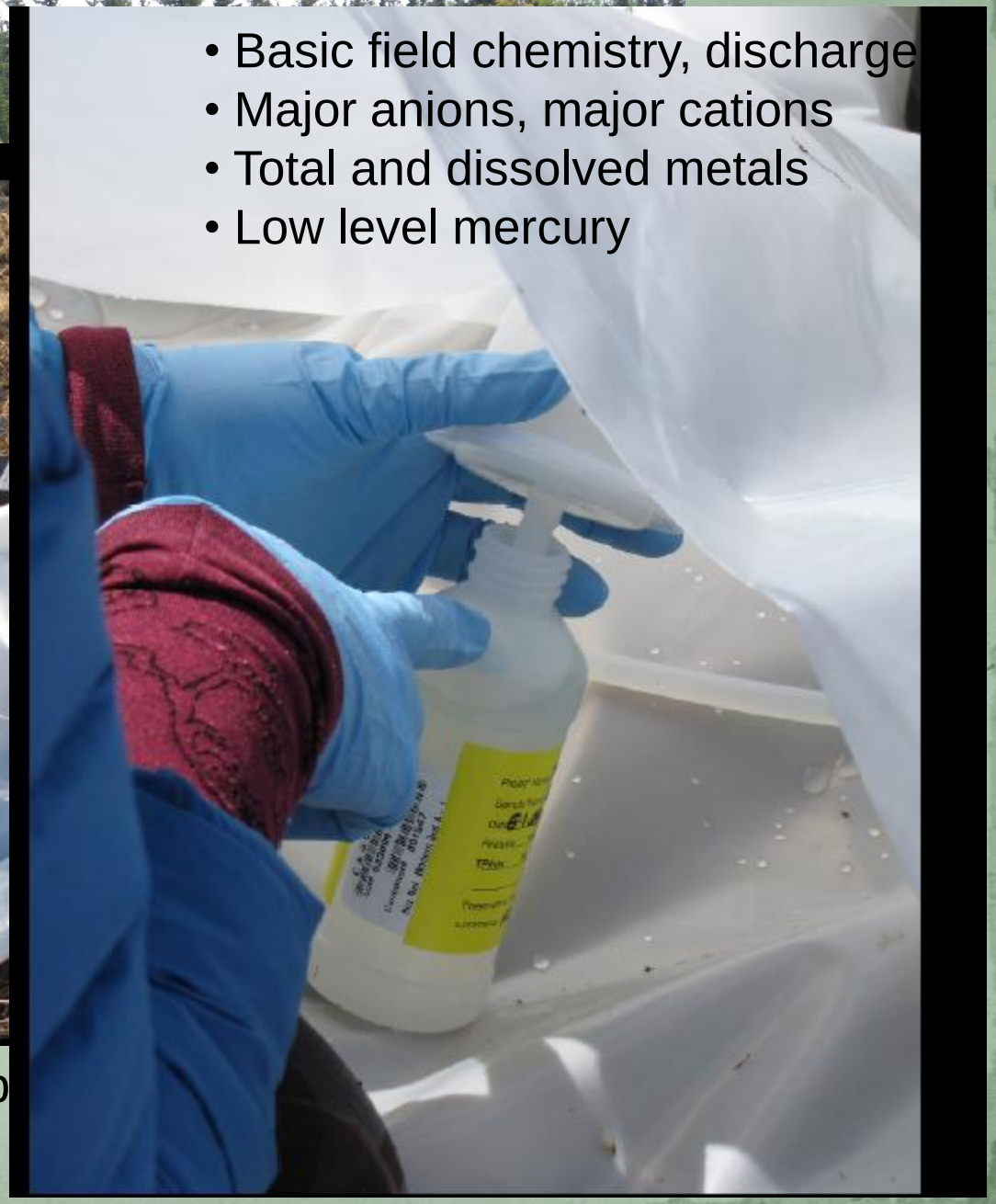
Study design for Water Chemistry

- Surface water sampling
  - 31 sites sampled at least once (2009-2010)
  - 3 sites in Chulitna drainage
  - 2 sites in Kaskanak Creek → Kvichak, near Katmai NPP
- Sampling conducted during and after break-up
  - May 2009 June 2009 June 2010
- Remote site
  - helicopter support
  - disposable tubing and filters replaced at every site

Full QA/QC

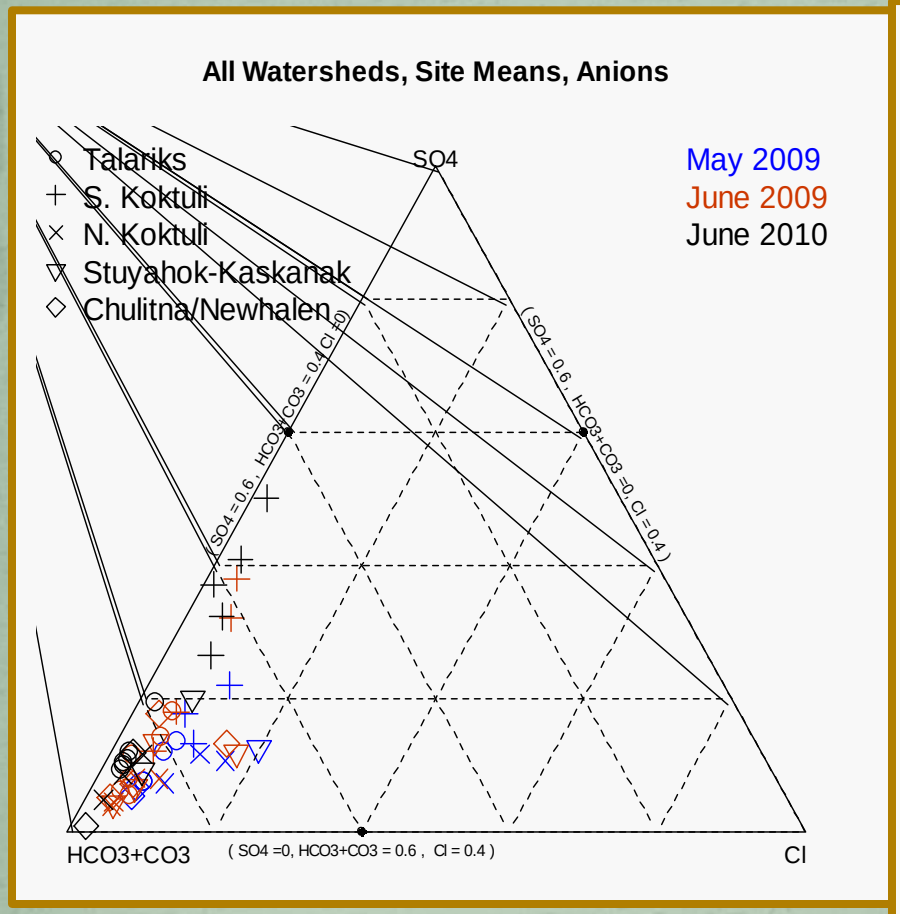
- In 2009, every site had duplicates collected; triplicates for metal analysis
- In 2010, every fifth site had duplicates, with quadruplicates collected for metal analysis
- In the field:
  - Equipment blanks
  - Trip blanks
- In the lab
  - Matrix spikes, duplicate matrix spikes
  - Duplicates
  - Lab control samples, method blanks

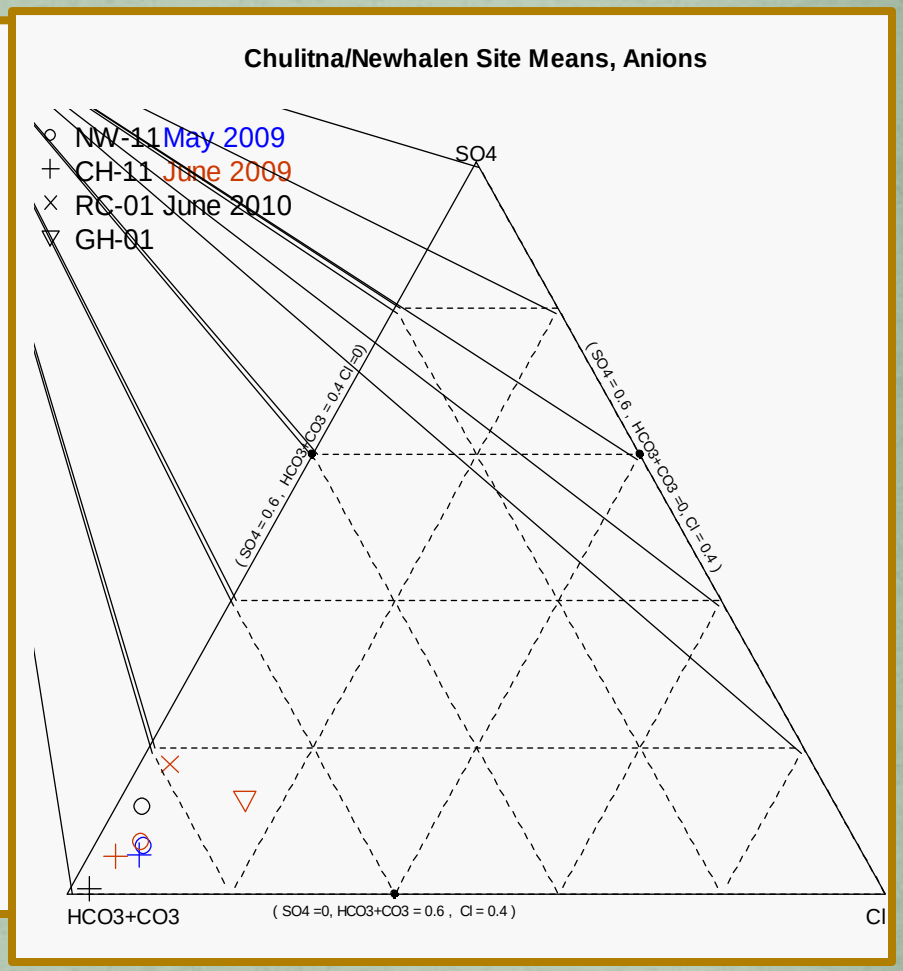
- Collection with peristaltic pump
- Filtered on the bank



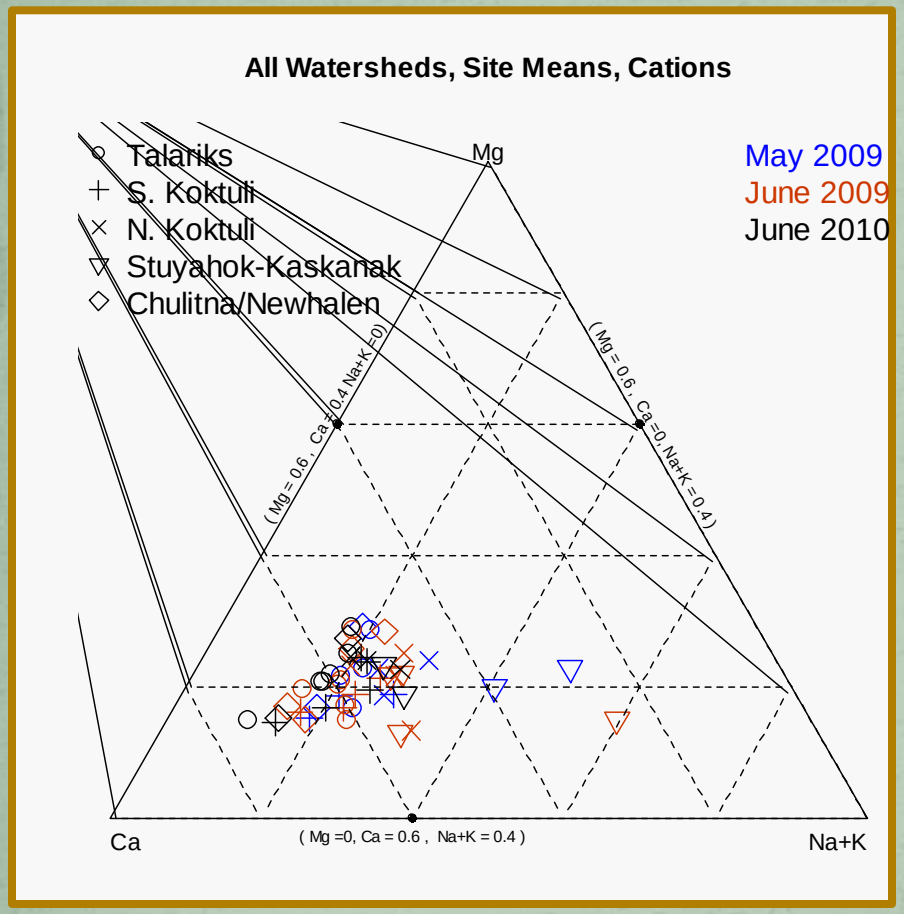
- Basic field chemistry, discharge
- Major anions, major cations
- Total and dissolved metals
- Low level mercury

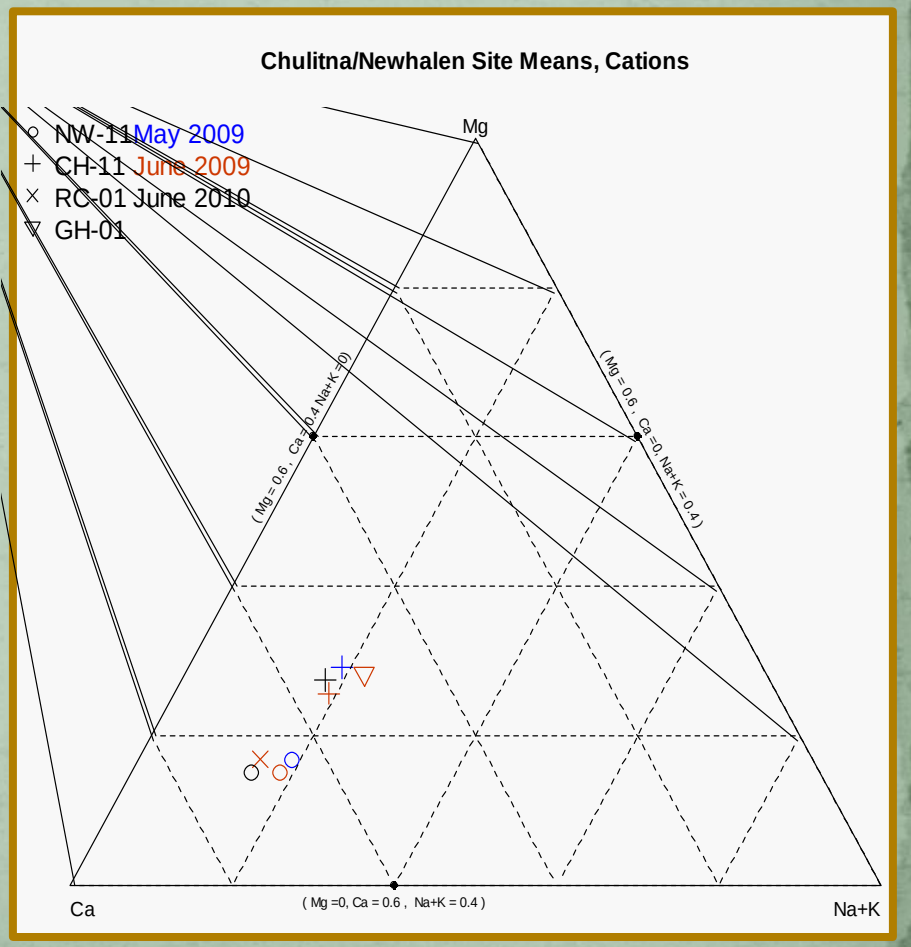
Results - anions





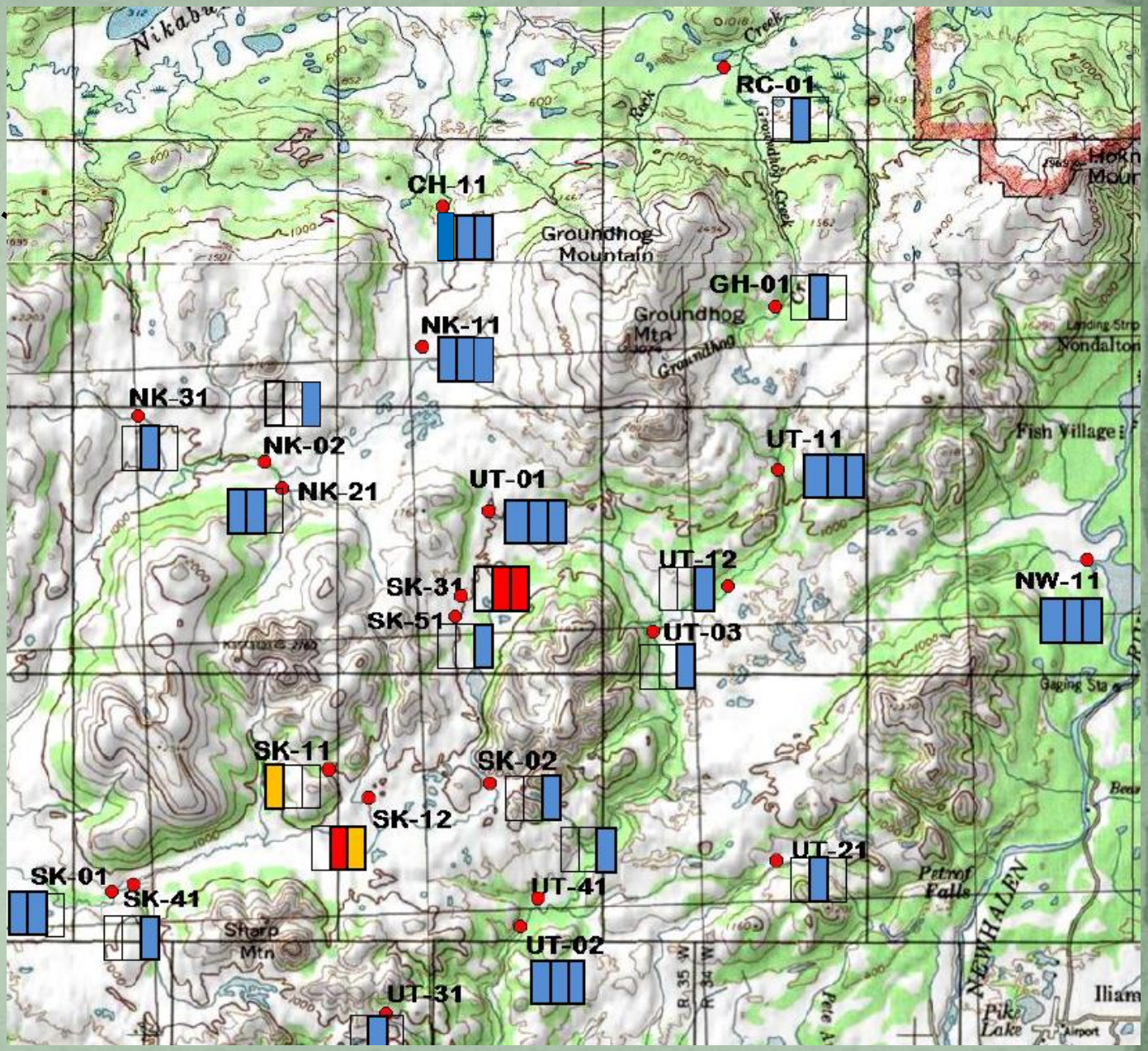
Results - cations





Copper

Total 1.4 ug/L
Dissolved 0.3 ug/L



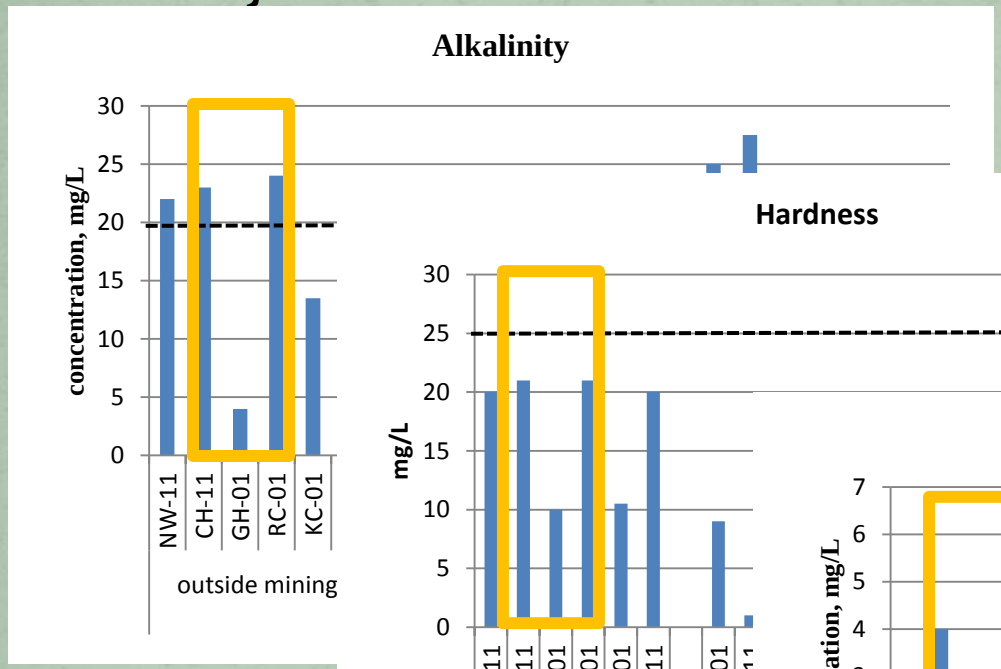
Blue – 0 to 1.8 ug/L
Orange – 1.9 to 3.9 ug/L
Red – 4+ ug/L
No color – no analysis

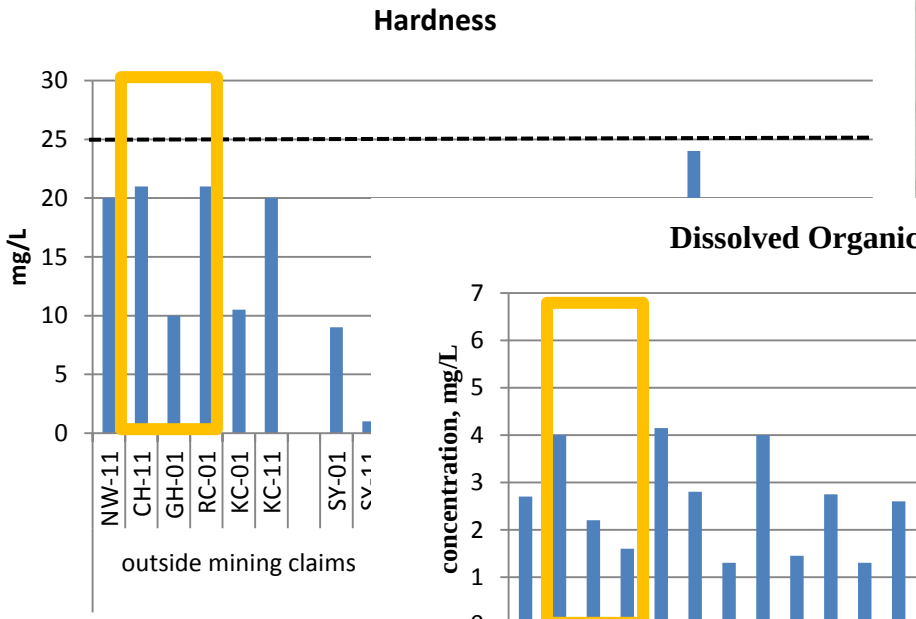
May 2009	June 2009	June 2010

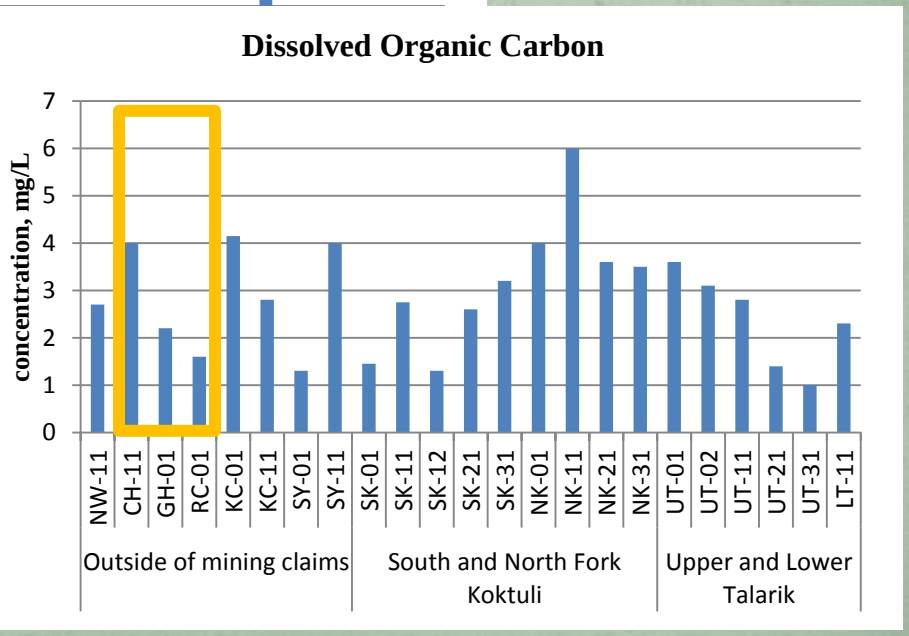
Copper standard – 1.8 ug/L at hardness 15 mg/L

Bioavailability

- Waters are low in parameters that can moderate the toxicity of metals such as hardness and DOC.

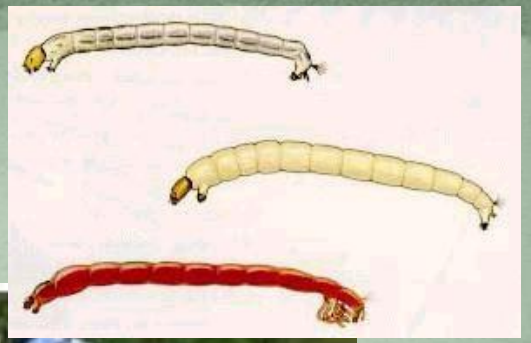






Other studies

- Bioassessment
  - Macroinvertebrates
  - Diatoms
  - Physical habitat
- Fisheries
  - Presence/absence
  - Abundance
  - Anadromous, resident
- Copper availability
- Seismic



Funded by the Nature Conservancy, Alaska Office

Summary

- Surface waters in Groundhog mountain/Chulitna River tributaries are calcium-bicarbonate type, low in metals, alkalinity, and DOC.
- Metals increase slightly at breakup.
- Water quality is similar to that found in the region.
- Non-traditional coalitions may be useful to collect
  - Baseline data
  - Integrated data
  - Long term monitoring?

Tsin'aen

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Independent team

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- University of Alaska, Anchorage
- Center for Science in Public Participation (CSP2), Anchorage/Chickaloon
- GroundTruthTrekking, Seldovia
- Stratus Consulting, Boulder CO

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